

## VAUX'S SWIFT (*Chaetura vauxi*)

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### Criteria Scores

Population Trend	Range Trend	Population Size	Range Size	Endemism	Population Concentration	Threats
10	0	7.5	5	0	0	15

### Special Concern Priority

Currently considered a Bird Species of Special Concern (breeding), Priority 2. Previously included only on CDFG's (1992) unprioritized list.

### Breeding Bird Survey Statistics for California

1966-1999					1966-1979			1980-1999			Credibility
Trend	<i>P</i>	<i>n</i>	(95% CI)	R.A.	Trend	<i>P</i>	<i>n</i>	Trend	<i>P</i>	<i>n</i>	
-1.1	0.76	22	-8.4, 6.1	0.25	-2.1	0.64	12	-2.1	0.46	17	Medium

### General Range and Abundance

One of seven subspecies, *C. v. vauxi* is the only one known to occur north of Mexico, where it breeds in western North America from southeastern Alaska, southern British Columbia, northern Idaho, and western Montana south to central California. Migrates in breeding range and to east from Idaho, Nevada, and Utah south through the southwestern United States, Baja California, and western Mexico. Winters from central Mexico south throughout the breeding range of the other subspecies in Middle America and in Venezuela (AOU 1998). There are no reliable quantitative estimates of abundance.

### Seasonal Status in California

Occurs primarily as a migrant and summer resident from mid-April to mid-October; breeding from early May (Bent 1940) to early August (J. Hunter unpubl. data). Occurs rarely and irregularly in winter in southern California (Garrett and Dunn 1981).

### Historical Range and Abundance in California

Grinnell and Miller (1944) described the Vaux's swift as "common" in summer and breeding in a narrow coast belt from the Oregon border in Del Norte County south to Santa Cruz, Santa Cruz County. Historic locations of confirmed breeding in the coast belt include Humboldt and Santa Cruz counties (Bendire 1895, Taylor 1905). Observations of birds at other possible breeding locations included Marin, Sonoma, and San Mateo counties (Grinnell and Wythe 1927).

Grinnell and Miller (1944) also reported this species as "occasional" in summer in the Sierra Nevada but lacked evidence of nesting; observations of birds at possible breeding locations along the Cascade-Sierra axis included Fresno, Lassen, Plumas, Sierra, Siskiyou, and Tehama counties. Migrated statewide (Grinnell and Miller 1944) with reports of flocks numbering in hundreds to tens of thousands (Sheldon 1922, Michener 1933, Watson 1933).

### **Recent Range and Abundance in California**

The breeding range on the northern and central coast appears to have changed little since 1945; this area still contains most of California's population (Sterling and Paton 1996). It is uncertain if recent records in northeastern California or coastwise in Santa Clara and Monterey counties (Roberson and Tenney 1993, Sterling and Paton 1996, FN 52:500) represent an actual range expansion, better observer coverage, or birds displaced by habitat removal in the redwood zone.

The range of the Vaux's swift in coastal California generally follows the distribution of redwood (*Sequoia sempervirens*), but is probably patchy because of forest fragmentation. Although lacking prior to 1945, confirmed breeding records now exist for Del Norte, Marin, Mendocino, and Sonoma counties (Sterling and Paton 1996, J. Hunter unpubl. data). Breeding bird atlas projects confirmed breeding by swifts in 19 (4.5%) of 425 and 9 (4.6%) of 195 survey blocks in Humboldt and Sonoma counties, respectively (Burridge 1995, J. Hunter et al. unpubl. data). Possible or probable breeding was recorded in 12 (5.4%) of 221 and 3 (0.8%) of 385 blocks in Marin and Monterey counties, respectively (Roberson and Tenney 1993, Shuford 1993). Observations of birds

along the Big Sur coast and in the Santa Lucia Mountains, Monterey County, may represent the southernmost breeding locations in the Coast Ranges.

Outside the redwood zone, small numbers of swifts probably breed locally in an arc from Trinity and western Siskiyou counties east to the Warner Mountains, Modoc and Lassen counties, and south on the west slope of the Sierra Nevada to Tulare County (Sterling and Paton 1996, Figure xx). The only confirmed breeding locations for these inland areas are in Modoc, Mariposa, and Tulare counties (AB 28:945, AFN 22:573, FN 52:500). Most breeding season records from the Sierra are from 1500-4500 ft (457-1433 m), with the southern limit of confirmed breeding for the region being at Log Meadow, Sequoia National Park, Tulare County (Sterling and Paton 1996, AB 28:945).

Migrates statewide with reports of roosting flocks in coastal counties numbering in the hundreds to tens of thousands (Huey 1960, Unitt 1984, Burridge 1995, K. Garrett pers. comm., T. Wodetzki pers. comm.). Many of these migrants undoubtedly nest north of California.

BBS trends in California for the periods 1966-1999, 1966-1979, and 1980-1999 are all negative but insignificant, and of medium credibility (Sauer et al. 2000). However, the loss of 96% of the original old-growth redwood forests in California (L. Fox pers. comm.) has reduced swift numbers substantially. Longtime observers consider a decline of this species likely due to logging of old-growth habitats (S. Harris pers. comm.). Other observers have either predicted or observed that the increasing use of chimneys by swifts for nesting or roosting was a result of the loss of suitable nest trees (Finley and Finley 1924, Bent 1940, Stager 1965). However, it is unknown the degree to which this possible shift in habitat use has offset population declines due to tree removal.

### **Ecological Requirements**

The ecology of this species is poorly known in California, but Bull and Collins (1993) summarized studies from elsewhere, mostly northeastern Oregon. These swifts nest in cavities in a variety of trees and less frequently in artificial structures, particularly chimneys. Nests are an open half circle

comprised of small twigs or conifer needles fastened together and to the cavity wall by sticky saliva. Birds may locate nests above or below the opening to the cavity, which they enter via a side hole or an open top. Cavities apparently need to be large enough to allow the birds to fly while within the cavity to enable placement of the nest at a distance from the opening that provides a dark, sheltered environment.

Of 33 live or dead grand firs (*Abies grandis*) used as nest trees in northeastern Oregon, 20 averaged 25.4 m tall and 67.5 cm DBH, and had hollow chambers averaging 28.4 cm in diameter and 5.7 m in length (Bull and Cooper 1991); 13 others averaged 83 cm DBH (Bull and Hohmann 1993). Many tree species are acceptable for nest sites as long as they grow large enough, persist long enough, and have decay, fire, primary excavators such as pileated woodpeckers (*Drycopus pileatus*), or otherwise develop large and accessible cavities. Other nests outside California have been in large broken-top western hemlock (*Tsuga heterophylla*) and hollow big leaf maple (*Acer macrophyllum*). Tree species used for nesting in California include sycamore (*Platanus* sp.; Bendire 1895), red fir (*Abies magnifica*; AFN 22:573), pine (*Pinus* sp.; B. Williams pers. comm., FN 52:500), and redwood. While published details are limited, most California nests have been in burned out and hollow redwood snags or stumps. One was in a hollow "stub" that was not over 9 m tall, with the nest being situated about 0.6 m above the ground (Taylor 1905). Dawson (1923) also mentioned nesting in hollow redwood stumps and snags in areas logged and burned over. Bent (1940) mentions four nests from Eureka, all in hollow redwood stubs ranging from 5.5 to 18.3 m tall, some of which were burned-out, and one of which was 3 m diameter at it's base. Nests in California are also located in basal hollows of large-diameter redwood trees (J. Hunter and M. Mazurek unpubl. data), formed when repeated fires incrementally enlarge the cavity by burning out rotten wood (Fritz 1931). Some such nest trees are in campgrounds, clearcuts, or other open areas; average canopy closure at nests in northeastern Oregon was 70.8% (Bull and Cooper 1991).

Numerous studies have shown a strong positive association between the presence of Vaux's swifts and old-growth forests (Bull and Collins 1993), presumably reflecting the swifts' requirement for large cavities for nesting. In California, the highest densities of swifts are found in the redwood zone, the lowest in the Douglas-fir (*Pseudotsuga menziesii*) and other forest types found further inland (Sterling and Paton 1996). The relationship between swifts and redwood forests may be explained by characteristics of these trees that favor the formation of large and long-lasting cavities. Redwoods can live over 2000 years and reach >7 m DBH (Sawyer et al. 2000). They are also resistant to fire and decay and will remain standing for very long time periods while declining or completely dead. The presence of swifts in second-growth redwood forests may be explained by the presence of remnant or residual old-growth trees (Sterling and Paton 1996). These scattered residual trees are often excellent potential nest and roost sites, as the reason they were not removed during initial harvest(s) was due to the presence of "cull" wood, deformity, or other defect. The unique characteristics of nest trees and, hence, their limited numbers may explain the high degree of traditional nest site use and individual nest site fidelity exhibited by this species (Bull and Collins 1996).

Vaux's swifts currently appear to nest in chimneys and other manmade structures more than in the past. Ten of the 12 nests reported in Humboldt County from 1995 to 1999 were in chimneys (J. Hunter et al. unpubl data). These Breeding Bird Atlas data, however, were undoubtedly biased toward the more easily observed chimney nest sites. This bias has led to many published accounts of chimney and smokestack nesting (e.g., Finley and Finley 1924, Bent 1940, Baldwin and Zaczkowski 1963, Thompson 1977). Vaux's swifts also occasionally nest in other manmade structures, such as in expansion cracks in a highway bridge in Mendocino County (G. Hazard and J. Hunter pers. obs.), an underground water transfer structure in Humboldt County (C. Gutierrez pers. comm.), and under the roof of a water tank in British Columbia (Bent 1940).

During the breeding season Vaux's swifts forage in a variety of habitats (especially over water) and at various heights, with small flying arthropods being the primary prey; radio-tagged birds have been recorded foraging up to 5.4 km from nests (Bull and Collins 1993).

Vaux's swifts require trees, snags, chimneys, or smokestacks with large hollows or cavities for nighttime roosting. Large numbers of swifts will roost together, especially during overcast or inclement weather during migration. Birds roost close together, presumably to conserve body heat. Roost sites are found in a variety of forested and urban environments. In northeastern Oregon, three roost sites were in broken-top grand fir trees averaging 19 m tall and 115 cm DBH. Eighteen other roost trees in northeastern Oregon were in either grand fir or ponderosa pine (*Pinus ponderosa*) and averaged 26 m tall and 77 cm DBH (Bull and Blumton 1997). Other tree species used for roosting include cottonwood (*Populus* sp.; Bendire 1895) and redwood (J. Hunter and M. Mazurek unpubl data). Although roosting in the open is quite rare, Stager (1965) photographed numerous swifts roosting on the external trunk of a tree near Davis Dam, Arizona.

## **Threats**

Loss of potential nest and roost sites are probably the primary threat to Vaux's swift. Although much of the remaining old-growth redwood is in protected areas, hazard tree removal and fire control programs destroy potential nest and roost trees and preclude their development. Within intensively managed second-growth forests, the current high value of old-growth redwood lumber encourages harvest of residual old-growth trees though only a small proportion may actually be merchantable (Hunter and Bond 2001). California Forest Practice Rules afford no protection for these trees, and allow cutting of snags for a variety of reasons, including safety, fire prevention, and the presence of merchantable wood. In addition, the recruitment of new large trees generally does not occur in lands managed for redwood lumber, and the burned out stumps and snags that remained after the initial harvest of old-growth redwood stands are becoming increasingly rare with time.

The Northwest Forest Plan does provide some protection for late seral habitats on Forest Service and Bureau of Land Management lands, but the bulk of the state's swift population occurs to the west in the largely private redwood zone.

Modernization and fire safety improvements to chimneys and smokestacks (e.g., installation of insulated pipe and spark-arresters) make their continued availability to swifts questionable (Bull and Collins 1993). Following the 1992 earthquake in Scotia, California, several old brick chimneys apparently used for nesting were damaged or destroyed. During repairs, they were replaced with modern stovepipes, and swifts are no longer seen in these specific areas (S. Chinnici pers. comm.). This suggests that single stochastic events can lead to potentially significant loss of nesting and roosting structures.

Another threat to the Vaux's swift is direct mortality at manmade roost sites. There are numerous anecdotal accounts in California of mass mortality events in which hundreds to perhaps low thousands of swifts roosting in chimneys or smokestacks are killed when furnaces or stoves are fired-up or when the birds somehow become trapped inside a home or other structure (AB 31:1044, K. Garrett and P. Unitt pers. comm.). These incursions are sometimes misinterpreted as attacks by swallows or bats, with detrimental results for the hapless swifts. The majority of these events undoubtedly go unreported, but see Michener (1933) and Huey (1960) for additional accounts. A mortality event at a roost containing many thousands of birds could be disastrous for swift populations.

Threats to *C. v. vauxi* in winter south of the U.S. border are unknown. Impacts from pesticides, roost site destruction, and mortality at roost sites are possible.

### **Management and Research Recommendations**

- locate and protect traditional nest and roost sites.
- require the retention of residual old-growth trees and snags in managed forests.

- provide for the recruitment of new nest and roost structures in managed and old-growth forests.
- install devices such as grills on hazardous smokestacks and other facilities (Candor 1995).
- educate the public about chimney nesting, migratory roosts, and mortality events (see Kellogg 2000).
- conduct basic research on habitat use and breeding biology of the Vaux's swift in California.
- evaluate habitat use patterns and threats on the winter range.

### **Monitoring Needs**

While Vaux's swifts are not well sampled by BBS methods, these are the only monitoring data available for this species. Hence there is a need to:

- develop standardized surveys to monitor the state population annually.
- devise protocols to survey for nests and roosts at sites proposed for habitat alteration.

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